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PATENT APPLICATION

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IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Daniel R. Blakley

Application No.: 10/758,813

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Examiner: R. Holmes

Group Art Unit: 3762

Title: SYNTHESIZING A REFERENCE VALUE IN AN ELECTROCARDIAL WAVEFORM

Mail Stop Appeal Brief - Patents
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TRANSMITTAL OF REPLY BRIEF

Transmitted herewith is the Reply Brief with respect to the Examiner's Answer mailed on September 27, 2007 .

This Reply Brief is being filed pursuant to 37 CFR 1.193(b) within two months of the date of the Examiner's Answer.

(Note: Extensions of time are not allowed under 37 CFR 1.136(a))

(Note: Failure to file a Reply Brief will result in dismissal of the Appeal as to the claims made subject to an expressly stated new ground rejection.)

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Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Dated: November 20, 2007

DANIEL R. BLAKLEY HP Docket No. 200315907-1

Serial No. : 10/758,813 Examiner R. Holmes

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S i r :

REPLY BRIEF OF APPELLANT

This Reply Brief of Appellant is presented in reply to the Examiner's Answer dated September 27, 2007.

I. STATUS OF THE CLAIMS

At the time of appeal to the Board, claims 1-15 and 27-32 were rejected under 35 U.S.C. § 102(b) as being anticipated by Nearing et al. (U.S. Patent No. 6,169,919, hereinafter "Nearing"). Further, claims 16-26 were rejected under 35 U.S.C. § 103(a) as being obvious over Nearing in view of Ekstrom (U.S. Patent No. 3,868,567, hereinafter "Ekstrom").

II. GROUND OF REJCTIONS TO BE REVIEWED ON APPEAL

In the Office action dated February 27, 2007, claims 1-15 and 27-32 are rejected under 35 U.S.C. § 102(b) as being anticipated by Nearing et al. (U.S. Patent No. 6,169,919);

Claim 16-26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nearing in view of Ekstrom (U.S. Patent No. 3,868,567.

III. ARGUMENT

Rejections under 35 U.S.C. § 102(b)

In the Appeal Brief, Appellant argued, among other things, that the Nearing reference does not teach each and every element as set for in the claims. Appellant continues to assert that the cited reference fails to disclose each feature of the pending claims.

Claim 1

In the Appeal Brief, Appellant argued that Nearing does not disclose dynamic referencing of a voltage value over a period of a selected beat. In response, the Examiner disagreed, arguing that the comprising format of the claim does not preclude the use of other beats. Therefore, the Examiner argued that while Nearing may sample over several beats, Nearing still meets the open-ended claim format, since Nearing uses multiple samples that include the sample from the selected beat to reference the selected beat. Appellant disagrees with the Examiner's argument.

The result of the baseline wander removal filtering in Nearning is "to normalize the ECG data to a common isoelectric baseline" (see column 6, lines 12-15). However, the normalization is not done one beat at a time, but rather via fitting a spline curve to three (or more) isoelectric points on three beats. Therefore, Nearing's method is to fit a spline curve to three isoelectric data points to create a baseline noise value spline curve and then normalize the beat ECG data by subtracting values of the spline curve from the ECG data to get noise free ECG beat data. The determination of the baseline noise in Nearing is done via isoelectric data points associated with three (or more) waveforms

or beats at a time (i.e., normalizing over a period of three or more beats). In contrast, Appellant's technique is to remove noise one waveform or beat at a time (i.e., dynamically referring the electrocardial waveform to the sample voltage value over a period of the selected beat). In other words, Nearing is referencing waveforms to isoelectric values in a 1 to 3 ratio (i.e., 1 waveform referenced to normalized noise over 3 waveforms), while Appellant is referencing in a 1:1 ratio (i.e., 1 waveform referenced to noise found in that same waveform). Appellant's method, therefore, is more accurately reducing noise in the signal by allowing the more frequent subtraction of noise from the incoming electrocardial waveform (see page 5, lines 11-31 of Appellant's disclosure).

Furthermore, "the periodic corrective action functions to maintain the input signal within the operative range of the amplifier, thereby allowing the predictable operation of the amplifier by correcting for DC wander and other low-frequency noise phenomena" (see page 5, line 31 to page 6, line 2 of Appellant's disclosure). Nearing's method, if used with analog signal analysis, would likely not maintain the input signal within the operative range of the amplifier, since Nearing's method is done after receiving three or more beat signals. Finally, Appellant's method is referencing the waveform to the actual isoelectric sample voltage value. In contrast, Nearing is referencing the waveform to values of a spline curve that have been fit to three isoelectric values from three beats. In other words, Appellant's method involves referencing to actual voltage noise data, whereas Nearing's method involves referencing to spline curve approximated data (see

column 5, line 31 to column 6, line 14 of Nearing). For at least all of the foregoing reasons, claim 1 is allowable over Nearing.

Claim 10

Independent claim 10 incorporates language similar to claim 1, including "the reference value corresponding to a selected beat" and "applies the reference value to the voltage signal over a period of the selected beat." The Examiner argues that Nearing discloses "that the sampled value (a voltage) is referenced over a period of the selected beat." Appellant disagrees, as argued above, that Nearning's reference value is determined via fitting isoelectric data from three (or more) beats to a spline curve and then referencing spline curve values to beat data over the period of the three (or more) beats (see column 5, lines 45-65). Nearing's reference value is actually a spline curve with many approximated values, where the spline curve was fit from three (or more) selected beats. Then, the spline curve values are applied over a period of the three (or more) selected beats. Therefore, it is submitted that for the same reasons that claim 1 is allowable over Nearing, claim 10 is also allowable.

Claim 27

In the final Office Action, the Examiner cited Nearing in rejecting claim 27, but did not identify specific language for the rejection. In the Appeal Brief, Appellant argued that Nearing does not disclose the use of first and second features as triggering events. In response, the Examiner argued that claim 27 does not require multiple triggers, but rather that the claim states that the triggering event has a first and second feature. Furthermore, the Examiner argues that Nearing discloses triggers containing multiple

features. Appellant notes that the triggers cited by the Examiner in Nearing refer to step 508 of Nearing's method having to do with eliminating noisy beats from the ECG data (see Fig. 5) and not to Nearing's method of removing noise from beats. This step/method of eliminating noisy beats is not a method for synthesizing a reference value as recited in claim 27, and further does not include "sampling the electrocardial waveform during an interval of relative inactivity and referencing the electrocardial waveform to the sample."

Additionally, as argued above, Nearing does not reference the waveform to the sample data directly. Therefore, as the language of claim 30 is similar to the language in claims 1 and 10, it is submitted that for same reasons claims 1 and 10 are allowable over Nearing, claim 30 is also allowable.

As claims 2-9, 11-15, and 28-32 depend directly or indirectly from claims 1, 10 and 27, Appellant submits that such claims are not anticipated or rendered obvious by Nearing for at least the same reasons as set forth above with respect to claims 1, 10, and 27.

As discussed above, in absence of a disclosure of each and every element of the rejected claims and in view of the teaching of the cited reference, claims 1-15 and 27-32 are not anticipated under 35 U.S.C. § 102(b). Appellant therefore respectfully requests that the rejection of claims 1-15 and 27-32 be withdrawn.

Rejections under 35 U.S.C. § 103(a)

In the Appeal Brief, Appellant argued, among other things, that the Nearing reference in combination with the Ekstrom reference does not teach each and every element as set forth in the claims.

Appellant continues to assert that the cited references, either individually or in any permissible combination, fail to disclose each feature of independent claims 16 and 22. As argued above, Nearing's reference value is not a direct voltage value of the received signal during an interval of relative inactivity. Instead, Nearing's reference value is a spline curve with many approximated values (where the spline curve is fit from three (or more) selected beats). Therefore, Nearing not only fails to show an analog circuit capable of creating a reference voltage (as admitted by the Examiner), but also fails to disclose the claimed subject matter as discussed in detail above having to do with determining the reference value.

Even if Ekstrom's analog circuit capable of creating a reference voltage were somehow combinable with Nearing, the reference voltage created by the combination would be different than the Appellant's reference voltage, at least in part, because Nearing's reference value is determined differently than that of the Appellant and is a normalization approximation utilizing a spline curve instead of a directly obtained sample voltage value. It would not be possible to analyze in "real time," as the Examiner argues, by utilizing Ekstrom's analog circuit with Nearing because Nearing's method relies on analysis of the beat data over a period of three (or more) beats to determine a common isoelectric baseline. This is in contrast to Appellant's real time

analysis as the signal is received (over a period of a single beat). In contrast to the Examiner's argument that Nearing in combination with Ekstrom would filter and analyze an electrocardial waveform in real time in a simplified fashion to reduce costs, it is rather Appellant's technology that is able to do such.

As claims 17-21 and 23-26 depend directly or indirectly from claims 16 and 22, Appellant submits that such claims are not rendered obvious by Nearing in combination with Ekstrom for at least the same reasons as set forth above with respect to claims 16 and 22.

The rejection of claims 1-32 under 35 U.S.C. § 102 (b) and 103(a) are improper for at least the reasons set forth above, and in Appellant's earlier-filed Brief of Appellant. Accordingly, the rejections of all pending claims should be reversed.

Respectfully submitted,

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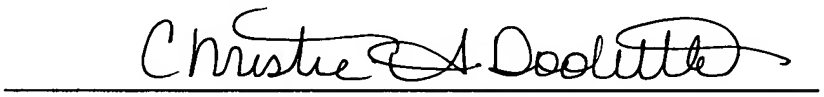

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